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13. Abstract ***(Maximum 200 Words)*** *(abstract should contain no proprietary or confidential information)*

High quality mammographic images enhance the radiologist's ability to interpret mammograms. Image quality is dependent upon adequate visualization and inclusion of tissue, adequate exposure, contrast and resolution; and proper compression. Meeting these criteria is essential to detection of cancer, since 73% of cancers are located in the peripheral or retroglandular fat. Pendent mammography, is a procedure whereby the patient leans forward 15 to 25 degrees during mammography, pulling the breast away from the body, and thereby increasing the amount of retroglandular breast tissue evident on a mammogram. We propose to test the benefits of pendent mammography by imaging 250 women by acquiring both conventional and pendent mammograms. We will then perform a quantitative analysis of the mammograms, to determine the effect of leaning on the amount of breast tissue imaged, the compression obtained, and the dose to the breast. To date, we have written the clinical protocol and have obtained IRB permission. We are currently awaiting approval by the DOD to begin patient image acquisition.

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FOREWORD

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X For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

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11/6/02

PI - Signature Date

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1. Introduction

High quality mammographic images enhance the radiologist's ability to interpret mammograms. Image quality is dependent upon adequate visualization and inclusion of tissue, adequate exposure, contrast and resolution; and proper compression. Meeting these criteria is essential to detection of cancer, since 73% of cancers are located in the peripheral or retroglandular fat. Pendent mammography, is a procedure whereby the patient leans forward 15 to 25 degrees during mammography. The thought is that gravity aids in pulling the breast away from the body, thereby increasing the amount of retroglandular breast tissue evident on a mammogram. Thus, pendent mammography should simplify positioning and made adherence to these criteria simpler and more frequent, and also allow better and less painful compression. There have been no published studies to quantify the benefits of pendent mammography. We have anecdotal evidence that pendent mammography provides superior images of the breast by including more tissue near the chest wall. In routine clinical practice at Thomas Jefferson University Hospital (TJUH) we feel that 0.5 to 1.0 cm of additional breast tissue is seen when pendent. It is also more common to see the posterior margins of the glandular tissue when pendent. We propose to test the benefits of pendent mammography by imaging 250 women by acquiring both conventional and pendent mammograms. We will then perform a quantitative analysis of the mammograms, to determine the effect of leaning on the amount of breast tissue imaged, the compression obtained, and the dose to the breast.

The work to date is reviewed in this annual report.

2. Body

2.1. Summary of Work Items

The following work items have been defined.

1) Develop a detailed clinical trial protocol, applicable forms, etc.
2) Enroll and image 250 women with both pendant and erect mammography
3) Perform a reader study of the resultant images
4) Perform a physical analysis of the resultant images
5) Perform a statistical analysis
6) Report results.

To date, we have completed item (1), and are awaiting DOD authorization to begin work item (2).

2.2. Discussion and Summary of Scientific Results

To date, we have written the research protocol (attached, Appendix 1). We are currently awaiting DOD authorization to begin the clinical trial portion of the grant.

3. Key Research Accomplishments

The following is a list of key research accomplishments resulting from this work:

- Developed the detailed research protocol.

4. Reportable Outcomes

None

5. Conclusions

In conclusion, we propose to evaluate the benefits of pendant mammography. To date, the research protocol has been written, and we are awaiting authorization to begin the clinical trial.

6. Appendices

Appendix 1 - Research Protocol

PROTOCOL

TITLE: QUANTIFICATION OF THE BENEFITS OF PENDANT MAMMOGRAPHY

DATE: June 20, 2002

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LOCATION OF STUDY:
Thomas Jefferson Breast Screening Center
909 Walnut Street, Ground Floor
Philadelphia, PA 19107

STUDY DURATION: 1 year project

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SYNOPSIS

Protocol Title: Quantification of the Benefits of Pendant Mammography

Trial Objectives: The primary objective of this trial is to:

- Demonstrate that pendant mammography results in improved diagnostic mammographic images

The specific aims of this trial are to:

- Compare the amount of breast tissue imaged in standard erect mammographic images and pendant mammographic images
- Compare the amount of compression required for standard erect mammographic images and pendant mammographic images
- Compare the dose of radiation the patient is exposed to during erect mammography and pendant mammography

Trial Design: This is an open-label, non-randomized trial that will be conducted at Thomas Jefferson University Hospital. All subjects will receive a both a clinically indicated standard erect screening mammogram and a research pendant mammogram.

Trial Population: This trial will consist of 250 adult (35 years of age or older) female subjects scheduled for an asymptomatic mammographic examination.

Trial Procedures: Subjects eligible for trial enrollment will be informed about the trial by a study investigator. Those subjects who agree to participate, and prove eligible (Form B) will sign an informed consent.

A study investigator will record demographics information (Forms A&C) on each patient prior to the clinical and study procedure.

All enrolled subjects will undergo a clinically indicated asymptomatic erect screening mammogram followed by a research pendant mammogram utilizing a clinical mammography imaging system that is capable of pendent mammography. Both the erect clinical examination and the pendant examination will consist of both CC and MLO views of both breasts.

During the pendant mammogram the mammographic platform of the standard mammographic unit will be tilted The pendant mammogram will be identical to the standard clinical mammogram, yet the mammographic platform will be tilted downwards, away from the subject's body, and the woman will be asked to lean forward. The combined erect and pendant examinations will take approximately 30 minutes.

Statistical Methodology: Quantitative values to assess the amount of breast tissue imaged will be computed by software that will evaluate the digitized standard and pendent mammograms. In addition, kVp (applied voltage to the x-ray tube), mAs (current to the x-ray tube), compressed breast thickness, compression force, tilt angle and rotation angle will be recorded. Mean glandular dose will be estimated from the kVp, mAs and the physical characteristics of the x-ray unit.

Subjective analysis by three radiologists will be performed to assess technical quality according to the criteria of ACR mammographic accreditation (e.g., motion, sharpness, contrast, etc.). The repeat rate for the two approaches will also be calculated according to standard ACR methodology.

All subjects who receive a standard, clinically indicated erect screening mammogram and a research

pendant mammogram will be included in the efficacy analyses.

The data will be analyzed statistically to determine whether in the pendent images: (H_1) more breast tissue is visible; (H_2) the breast is better compressed; and (H_3) the dose of radiation is lower. The statistical tests to be used will depend upon the distribution of the data being analyzed. It is likely that we will use one of the student's t-test, the Kolmogorov-Smirnov test, or the Wilcoxon-Mann-Whitney test for the comparison of two populations. Pairwise testing of pendent and non-pendent images is planned for the clinical image quality evaluation. Given the size of the population and the expected size of the effect, it is likely that we will demonstrate that a statistically significant increase in breast tissue is seen in pendent mammography.

1. INTRODUCTION

High quality mammographic images enhance a radiologist's ability to interpret mammograms. Important factors in ensuring optimal image quality include: 1) adequate visualization of areas of clinical or radiographic concern; 2) optimal amount of tissue inclusion; 3) adequate exposure; 4) high contrast; 5) high resolution; and 6) proper compression. Also, with 73% of breast cancers located in peripheral or retroglandular fat, adequate visualization of these areas, as well as having high quality images, are of the utmost importance.

Proper positioning of the breast during imaging ensures optimal images of the entire breast. One potential technique to optimize positioning, and therefore enhance image quality, is a positioning technique called pendant mammography.

1.1 Background

Pendant mammography is a procedure in which the mammography platform is angled to allow the patient to lean forward 15-25 degrees during the mammographic imaging. By leaning slightly forward, gravity aids in pulling the breast away from the body increasing the amount of breast tissue imaged on the mammogram. Because the breast is in a more anatomically natural position, it is thought that compression of the tissue will be greater and the pain to the patient will be less. Modern mammography units automatically calculate the radiation dose to the breast based on the amount of compression, with a more compressed breast requiring less radiation for optimal images. Therefore, pendant mammography may result in less radiation to the patient while obtaining higher quality images.

1.2 Rationale

Although pendant mammography is a technique that is currently used in clinical practice, there have been no published studies to quantify the benefits of the technique. From our clinical experience at Jefferson's Breast Imaging Center, we have anecdotal evidence that pendant mammography provides superior images of the breast by including an additional 0.5-1.0 cm of breast tissue near the chest wall on mammographic images. A prospective trial of patients who receive both standard and pendant mammography will provide the data to determine the benefits of the pendant technique, and potentially improve patient care.

2. TRIAL OBJECTIVES

The primary objective of this trial is to:

- Demonstrate that pendant mammography results in improved diagnostic mammographic images

The specific aims of this trial are to:

- Compare the amount of breast tissue imaged in standard erect mammographic images and pendant mammographic images
- Compare the amount of compression required for standard erect mammographic images and pendant mammographic images
- Compare the dose of radiation the patient is exposed to during erect mammography and pendant mammography

3. TRIAL DESIGN

This is an open-label, non-randomized trial that will be conducted at Thomas Jefferson University Hospital. All subjects will receive a both a clinically indicated standard erect screening mammogram and a research pendant mammogram.

Demographics (Forms A&C) will be recorded on each patient prior to the clinical and study procedure, by a study investigator.

3.1 Trial Duration

Individual participation in this trial will be limited to two mammographic imaging studies (clinically indicated standard erect examination and pendant examination) acquired on the same day. Each examination will require approximately 15 minutes for a total of 30 minutes.

Subject recruitment is expected to last 10 months (months 1-10), image analysis (months 1-11), database entry for image analysis (months 1-12), and analysis and publication of imaging results (month 12). Since this study involves less than minimal risk, Volunteer Registry Database forms do not need to be completed.

4. TRIAL POPULATION

This trial will consist of 250 adult (35 years of age or older) female subjects scheduled for an asymptomatic mammographic examination. For recruitment, a study investigator will discuss the study with patients that present for an asymptomatic screening mammogram at Jefferson's Breast Imaging Center. The patient will be given time to consider whether they are interested in participating in the study.

4.1 Inclusion Criteria

All subjects accepted for this trial must:

- Subject must give written informed consent
- Be willing and able to continue study participation
- Be a female at least 35 years of age on the day informed consent is obtained
- Be scheduled for an asymptomatic screening mammogram

4.2 Exclusion Criteria

Subjects with any of the following conditions or who have had the following procedures will be excluded from this trial:

- Subject is pregnant (testing procedure described below)
- The subject has breast implants
- The subject has had breast surgery or radiation therapy in the last 5 years
- The subject is currently nursing or ceased nursing in the last 6 months
- The subject has large breasts that would require her to have more than 4 films per breast

Subject identification will be maintained with a study specific alphanumeric code including the patient number (001-250) and the patients initials. The information, and the information on Form A will be entered into a confidential patient database. These are the only data in this database. The contents of this database will only be accessible to Dr. Maidment, the principle investigator. These records (Form A) will be stored separately in a secure location.

5. TRIAL PROCEDURES

5.1 Subject Recruitment and Assessment

Women will be recruited from those scheduled for a screening mammogram at the Thomas Jefferson University Hospital Breast Screening Center, 909 Walnut Street, Philadelphia, PA. That site has a Bennett Contour mammography system capable of pendant mammography.

Women scheduled for screening mammography have been triaged by a trained telephone operator as part of the standard clinical scheduling process. The women are generally asked if "they have experienced any problems with their breasts?" Typical problems include focal breast pain, a palpable mass, skin changes (thickening, puckering or redness), or nipple discharge. Any women experiencing such problems will be scheduled for a diagnostic mammogram at the Thomas Jefferson University Hospital Breast Imaging Center, 1100 Walnut Street, Philadelphia, PA. Typically, women who are pregnant or lactating, or who have had a recent history of breast surgery or breast cancer, or who have breast implants will also be scheduled for diagnostic, rather than screening mammography. Only asymptomatic women are thus scheduled for screening mammograms.

Women will be approached at the time they are registered on-site for their screening mammogram. They will be asked to participate in the study by study investigator. The investigator will determine the initial interest of the patient. Upon expression of initial verbal interest in the study, the patient will be taken to a private area to fully discuss the study and obtain written informed consent.

After informed consent, Forms A, B, and C will be completed by the research coordinator, with the assistance of the subject. The patient will then be given a urine pregnancy test, if the patient is not menopausal (defined as being amenstrual for at least 1 year) or if the patient is not sterile (e.g., having had a tubal ligation). If the pregnancy test is negative, and the other eligibility criteria are met, then the

patient will be enrolled in the study. Otherwise, enrollment will be discontinued (Form X). The subject may also choose to discontinue participation in the study at any time (Form X).

The patient will then be allowed to gown (in private) and will then be escorted to the mammography room for the clinical and experimental procedures.

5.2 Mammographic Imaging

Mammographic examinations will be performed by a licensed, MQSA-qualified mammographic technologist. Procedures and equipment for this trial will be used in accordance with typical clinical procedures. All trial procedures will be conducted in accordance with Good Clinical Practice.

All enrolled subjects will undergo a clinically indicated asymptomatic screening mammogram and a research pendant mammogram utilizing a Bennett Contour Plus clinical mammography system that is capable of pendent mammography. The order of the mammograms will be randomly assigned. During the pendant mammogram the mammographic platform of the standard mammographic will be tilted The pendant mammogram will be identical to the standard clinical mammogram, yet the mammographic platform will be tilted downwards, away from the subject's body, and the woman will be asked to lean forward. The pendant examination will take approximately 15 minutes.

The technologist will complete Form E, indicating the number of films, and the number of repeats (if any). A complete study would consist of an MLO and CC film of each breast in both the erect and pendant position. The complete study will consist of 8 films for women with two breasts, and four films for women with one breast.

The technologist will then invite the subject to dress, and the subject is then free to leave.

The radiologist interpreting the subjects films will have access to all films (pendant and erect) while reporting the clinical mammography study. If the radiologist observes any abnormality on any film (erect or pendant), they will recall the patient for additional diagnostic mammography, as is already practiced clinically today. It is important to realize that women are routinely imaged with either pendant or erect mammography every day at the TJUH Breast Imaging and Breast Screening Centers. However, there has not previously been a quantitative comparison of the benefits of the two approaches. Thus, with the exception that more views of each breast have been taken, no additional clinical interdiction is expected.

5.3 Efficacy Assessments

The erect and pendant studies will be reviewed retrospectively by three radiologists to determine the clinical benefits of the pendant mammography. This evaluation will involve a direct comparison of the erect and pendant mammograms for the same patient. The erect and pendant studies will be hung on an 8-panel viewbox with either the erect or pendant study randomly assigned to the upper panels. The radiologists will be blinded to the patient position and patient information, by applying black tape to the identification region of each film. The films of each method will be randomly assigned a letter A or B. The radiologists will be asked to state their preference for each film in terms of the ACR criteria for clinical technical quality, namely:

1) Compression
2) Exposure
3) Contrast
4) Sharpness, and
5) Noise.

The radiologists will also be asked which method (A or B) produces the best overall image quality for the study, and the best depiction of the clinical content. These data will be recorded on Form D.

All films will be digitization after the clinical mammographic interpretation, and prior to the clinical image quality determination. A research technician will take the studies, digitize the films, and return the films to the research film archive. The name and other clinical information optically printed on the films of each subject will be obscured prior to digitization. The digital image files will be named according to the subject number, projection and acquisition mode (pendant/erect). These data will be archived into two redundant data sets for security.

The study technician will also be responsible for transcribing the mammographic acquisition parameters into the research database, at or about the time of digitization.

Computer software will be written to analyze the images. The software will be developed to analysis the images in terms of: 1) shortest distance from nipple to chest wall edge of film (CC); 2) distance from nipple to chest wall (orthogonal to pectoral muscle – MLO); 3) length of axillary tail (MLO); 4) area of breast in the image; 5) area of the glandular tissue in the image; and 6) area of the pectoral muscle in the image. These data will be added to the research database automatically, using the subject number, projection and acquisition mode as indices into the database.

Two databases will be constructed, a subject database and a research database. The research technician will enter all of the data.

The subject database will contain the information recorded on Form A. The completed forms will be stored separately from the other records for this trial. These forms will be stored in a secure location. The subject database will only contain the patient name, medical record number, subject initials, and subject number. Dr. Maidment will have sole access to the subject database and completed copies of

Form A. In all other records, only the subject initials and number will be used as a redundant identifier of the subject.

The research database will contain all other information on the subjects, including subject status (active/withdrawn). The database will encode all of the information on Forms B-E and X. In addition, the following will be extracted by the research technician from the optically encoded information on each film.

1) kVp
2) mAs
3) Compressed Thickness
4) Compression Force
5) Tilt Angle
6) Rotation Angle

The mean glandular dose will be computed from 1, 2, and 3.

5.4 Risks/Benefits Assessment.

Risks for the study are minimal. Each of the patients' breasts will be compressed during the pendant mammography exam, just as they are during the clinically indicated standard mammography exam. The patients will be exposed to additional radiation from the pendant exam totaling 0.25 mSv. The proposed procedure poses no apparent additional risk to the subject greater than from a standard diagnostic imaging study or than encountered by natural background. Typical effective dose values for various medical procedures, background and dose limits for an occupational worker are provided below for reference. The patient will receive 0.25 mSv of radiation from the clinical screening mammogram that her doctor has ordered, and an additional 0.25 mSv from the pendant mammogram performed as part of this research study. Therefore, the total amount of radiation that the subject will be exposed to will be 0.50 mSv. The mammography machines are routinely calibrated and evaluated to ensure that the amount of radiation the subject are exposed to is within the federal guidelines.

Radiation Source	Typical Effective Dose (mSv)
Chest X-ray PA projection[1]	0.02
Abdomen X-ray AP projection[1]	0.7
CT of the head[1]	2
Natural background per year	3
Nuclear Medicine Bone Scan	6
Barium enema study[1]	7
CT of the pelvis[1]	10
Annual limit for an occupational worker, e.g. X-ray technologist	50

Source: 1) Br J Radiol, 70(833), 437-439 (1997).

The only other risk associated with this study is the risk of breach of confidentiality. To minimize against these risks, all records will be kept confidential.

Possible benefits from this study for the patient would be if the pendant mammogram images additional tissue that is not imaged on the standard mammogram. There may be a benefit to society in general if it is determined that pendant mammography images more breast tissue, better compresses the breast, and lowers the radiation dose to the patient.

To minimize and/or eliminate the risk of breach of confidentiality, patient confidentiality will be maintained at all times. All records will be identified by a study specific code and personal identifiers and linkage to study identification numbers will be maintained separately in locked file cabinets to which only limited research staff will have access. No individual subject will be identified by name in any reports from the study.

The risk benefit ratio is low. Based on the available safety data and the anticipated radiation dose levels that will be used in this study, safety concerns are minimal. In a relatively healthy outpatient population referred for asymptomatic screening mammograms we do not expect any adverse events.

5.4.1 Adverse Experiences

Adverse experiences that are both serious and unexpected will be immediately reported by telephone to the USAMRMC Deputy Chief of Staff for Regulatory Compliance and Quality (301-619-2165) and send information by facsimile to 301-619-7803). A written report will follow the initial telephone call within 3 working days. The written report will include the investigator's evaluation of the relationship of the adverse event to the subject's participation in the study, identification of the individual who completed the report, and the signature, printed name and identity (investigator, study physician, etc.) of the individual who is providing the information.

The written report will be addressed to the U.S. Army Medical Research and Materiel Command, ATTN: MCMR-RCQ, 504 Scott Street, Fort Detrick, Maryland 21702-5012. A follow-up report describing the resolution of the adverse event need to be provided.

The written report for any SAEs that occur during the study, whether or not related to the research procedures must be submitted immediately (within 24 hours) to the University's Institutional Review Board.

A copy of the SAE should be retained on file with the respective subject's data forms.

5.5 Discontinuation of Subjects

Subjects will be free to discontinue trial participation at any time. The investigator will also discontinue any subject from the trial if, in the investigator's opinion, it is not safe for the subject to continue. The date the subject is withdrawn from a treatment and/or from the trial and the reason for discontinuation will be recorded on the CRF (Form X).

Trial participation will be considered completed if the subject has met all of the following trial requirements:

- Has undergone the standard screening mammogram as part of the clinical care
- Has undergone the pendant mammogram as part of the clinical care

If a subject's participation in the trial is interrupted for any reason (e.g., because of an AE or machine failure) and the subject has met the criteria described above for completing the trial, the subject's trial participation will be considered completed. If a subject's trial participation is interrupted for any reason by the subject's or investigator's choice and the subject has not met all of the criteria listed above, then the subject will be considered a discontinued subject.

6. DATA MANAGEMENT AND STATISTICAL ANALYSES

6.1 Data Management

Data forms will be completed for all subjects enrolled in the trial. The patient study files will be stored in a secure file cabinet and maintained by the research study personnel. Form A will be maintained separately, and will only be assessable to the principle investigator. Patient study files will be kept for 7 years after the completion of the study.

The final data will be entered into two databases, a confidential subject database, and a research database. Only the subject database will contain confidential information. The research database will not contain information directly linkable to a specific women, without knowledge of the information contained in the subject database. The principle investigator will be responsible for management of the databases. The databases will be maintained within separate, organized and secure directory systems.

6.2 Statistical Analyses

The primary objective of this study is to demonstrate that pendant mammography results in improved diagnostic mammographic images.

6.2.1 Hypotheses:

H_1: Mammograms acquired in a pendent position result in significantly more breast tissue being imaged than conventional mammograms acquired with the patient erect.

H_2: Mammograms acquired in a pendent position result in better compression of breast tissue than conventional mammograms acquired with the patient erect.

H_3: Mammograms acquired in a pendent position result in a smaller dose of radiation to the patient that that required for conventional mammograms acquired with the patient erect.

6.2.2 Analysis of Results

The data will be analyzed statistically to determine whether in the pendent images: (H_1) more breast tissue is visible; (H_2) the breast is better compressed; and (H_3) the dose of radiation is lower The statistical tests to be used will depend upon the distribution of the data being analyzed. It is likely that we will use one of the student's t-test, the Kolmogorov-Smirnov test, or the Wilcoxon-Mann-Whitney test for the comparison of two populations. Pairwise testing of pendent and non-pendent images is planned for the clinical image quality evaluation. Given the size of the population and the expected size of the effect, it is likely that we will demonstrate that a statistically significant increase in breast tissue is seen in pendent mammography.

6.2.3 Efficacy Measures

Quantitative values to assess the amount of breast tissue imaged will be computed by software that will evaluate the digitized standard and pendent mammograms. In addition, kVp (applied voltage to the x-ray tube), mAs (current to the x-ray tube), compressed breast thickness, compression force, tilt angle and rotation angle will be recorded. Mean glandular dose will be estimated from the kVp, mAs and the physical characteristics of the x-ray unit.

Subjective analysis by three radiologists will be performed to assess technical quality according to the criteria of ACR mammographic accreditation (e.g., motion, sharpness, contrast, etc.). The repeat rate for the two approaches will also be calculated according to standard ACR methodology.

6.2.4 Sample Size Calculation

A sample size calculation for is based upon a desired power (1 – beta) of 0.88 and an alpha error of 0.05.

APPENDIX A - INVESTIGATOR OBLIGATIONS

A. Institutional Review Board (IRB) and Human Subjects Research Review Board (HSRRB) Review/Approval

The protocol and informed consent for this study, including advertisements used to recruit participants, must be reviewed and approved by an appropriate IRB and HSRRB prior to enrollment of participants in the study. It is the responsibility of the investigator to assure that all aspects of the ethical review are conducted in accordance with FDA Regulations 21 CFR Part 56. A letter documenting the IRB and HSRRB approval which specifically identifies the study/protocol must be obtained by the investigator prior to initiation of the study. Amendments to the protocol will be subject to the same requirements as the original protocol. The HSRRB must review and approve each modification to the study prior to implementation.

A progress report with a request for re-evaluation and reapproval will be submitted by the investigator to the IRB and HSRRB at intervals required by the IRB, and not less than annually.

After completion or termination of the study, the investigator will submit a final report to the IRB. This report should include: deviations from the protocol, the number and types of participants evaluated, the number of participants who discontinued (with reasons), results of the study, if known, and all AEs, including deaths.

B. Informed Consent

Signed, written informed consent which conforms to FDA Regulation 21 CFR Part 50, must be obtained from each participant prior to entering the study. Each participant will be provided a written consent form and verbal information in an understandable manner which describes the nature and duration of the study. A study investigator will conduct the informed consent interview in a private examination room. The potential subject will be allowed to discuss the study with a study investigator or any persons who may have accompanied the potential subject. Additionally, the participant must be allowed adequate time to consider the potential risks and benefits associated with his participation in the study. A witness must also sign, date, and initial the consent form. Two copies of the consent form should be completed so that the subject can get an original copy and a copy can be kept for the investigator's study records.

C. Data Reporting and Data Forms

Data reflecting participant's experiences with the study will be recorded on CRFs by the investigator.

D. Records Retention

All records pertaining to the conduct of the clinical study, including CRFs, informed consent forms, source documents, and other study documentation must be retained for seven years after the end of the study.

Other study documentation includes all protocols and amendments, IRB correspondence and approvals, signed consent forms, a blank copy of study consent forms, Form 1572, curriculum vitae or biosketches

of members of the research team, HSRRB correspondence and approval, and Statement of Investigator forms.

Source documents include all original records of observations, results, and activities necessary to reconstruct and evaluate the study. Source documents include but are not limited mammographic films, and any other records or reports of procedures performed during the study. Source documents also may include copies of the CRF when original information is recorded directly onto these forms.

Whenever possible, an original recording of an observation should be retained as the source document. However, a photocopy of a record is acceptable provided it is legible and is a verified copy of the original document.

E. Deviation from the Protocol

The investigator will not deviate from the protocol without prior written approval from the IRB and the HSRRB. In medical emergencies, the investigator will use medical judgment and remove the participant from immediate hazard. The HSRRB and the IRB will be notified regarding the type of emergency and course of action taken. Any other changes to or deviations from the protocol will be made as an amendment to the protocol. The amendment must be submitted for review and approval to the local IRB and the HSRRB for review and approval.

F. Roles and Responsibilities of Study Personnel

Andrew Maidment, Ph.D., Assistant Professor of Radiology will serve as Principal Investigator on this grant. He will be responsible for the scientific goals of the project. Dr. Maidment will develop the analysis software and oversee the digitizing of the mammograms, data entry and statistical analyses. He will also prepare any manuscript(s) resulting from this grant.

Catherine Piccoli, M.D., Clinical Associate Professor of Radiology and Director of the Breast Imaging Center, will assist in patient recruitment and perform the subjective imaging analysis.

Susan Trevisan, M.D., Assistant Professor of Radiology, will assist in patient recruitment and perform the subjective imaging analysis.

Predrag Pakic, Ph.D., Post Doctorate Fellow in the Department of Radiology, will digitize the mammograms, run the analysis software, and perform the data entry.

Laurence Parker, Ph.D., Research Assistant Professor of Radiology will serve as the study statistician. Dr. Parker will complete the statistical analysis in month 12.

Signature of PI: _____
Andrew Maidment, PhD

APPENDIX B – CASE REPORT FORMS

Clinical Evaluation of Pendent Mammography	Subject Initials F M L	Subject Number

Form A: Subject Information

1) Name: _____

2) TJUH MR#: | | | | | | | | |

STRICTLY CONDIFENTIAL

Clinical Evaluation of Pendent Mammography	Subject Initials F M L	Subject Number

Form B: Eligibility

Inclusion Criteria: If a shaded box is checked, the patient may not enter the trial.

	Yes	No
1. Is the subject a female 35 years of age or older?	☐	■
2. Did the subject provide a signed informed consent after receiving a verbal and written explanation of the purpose of the study?	☐	■
3. Is the subject scheduled for screening mammography?	☐	■

Pregnancy Test Determination: If a shaded box is checked, then a pregnancy test is necessary prior to entry into the trial

	Yes	No
1. Has the subject had a tubal ligation or is otherwise sterile?	☐	■
2. Has the subject reached menopause (LMP more than 1 year ago)?	☐	■

Exclusion Criteria: If a shaded box is checked, the patient may NOT enter the trial.

	Yes	No
1. If a pregnancy test was determined to be necessary, did the subject have a positive pregnancy test?	■	☐
2. Does the subject have breast implants?	■	☐
3. Has the subject had breast surgery or radiation therapy in the past 5 years?	■	☐
4. Is the patient currently nursing, or ceased nursing in the last 6 months?	■	☐

Clinical Evaluation of Pendent Mammography	Subject Initials F M L	Subject Number

Form C: Study Demographics

1) Study Date: ☐☐ ☐☐ ☐☐
Mo Day Year

2) Date of Birth: ☐☐ ☐☐ ☐☐
Mo Day Year

3) Sex: ☐ Female ☐ Male

4) Race:
- ☐ Caucasian
- ☐ Black
- ☐ Asian
- ☐ Hispanic
- ☐ American Indian or Alaskan Native
- ☐ Other (Specify) _____

5) Are you currently taking hormonal replacement therapy (HRT)?
☐ Yes ☐ No

6) What is your Menopausal Status?
- ☐ Premenopausal
- ☐ Perimenopausal
- ☐ Post-menopausal

Clinical Evaluation
of Pendent Mammography

Subject Initials ☐☐☐ (F M L)

Subject Number ☐☐☐

Radiologists Initials ☐☐☐ (F M L)

Form D: Clinical Image Quality

RCC

	A Markedly Superior to B	A Superior to B	A Comparable to B	B Superior to A	B Markedly Superior to A
Compression	☐	☐	☐	☐	☐
Exposure	☐	☐	☐	☐	☐
Contrast	☐	☐	☐	☐	☐
Sharpness	☐	☐	☐	☐	☐
Noise	☐	☐	☐	☐	☐

RMLO

	A Markedly Superior to B	A Superior to B	A Comparable to B	B Superior to A	B Markedly Superior to A
Compression	☐	☐	☐	☐	☐
Exposure	☐	☐	☐	☐	☐
Contrast	☐	☐	☐	☐	☐
Sharpness	☐	☐	☐	☐	☐
Noise	☐	☐	☐	☐	☐

LCC

	A Markedly Superior to B	A Superior to B	A Comparable to B	B Superior to A	B Markedly Superior to A
Compression	☐	☐	☐	☐	☐
Exposure	☐	☐	☐	☐	☐
Contrast	☐	☐	☐	☐	☐
Sharpness	☐	☐	☐	☐	☐
Noise	☐	☐	☐	☐	☐

LMLO

	A Markedly Superior to B	A Superior to B	A Comparable to B	B Superior to A	B Markedly Superior to A
Compression	☐	☐	☐	☐	☐
Exposure	☐	☐	☐	☐	☐
Contrast	☐	☐	☐	☐	☐
Sharpness	☐	☐	☐	☐	☐
Noise	☐	☐	☐	☐	☐

Entire Study

	A Markedly Superior to B	A Superior to B	A Comparable to B	B Superior to A	B Markedly Superior to A
Image Quality	☐	☐	☐	☐	☐
Clinical Value	☐	☐	☐	☐	☐

Clinical Evaluation
of Pendent Mammography

Subject Initials: | | | | (F M L)

Subject Number: | | | |

Form E: Technical Information

1) Study Date: | | | | | | | (Mo Day Year)

2) Technologists Initials: | | | | (F M L)

3) Films Completed:

	RCC	RMLO	LCC	LMLO
Erect	☐	☐	☐	☐
Pendant	☐	☐	☐	☐

4) Where any retakes made:

☐ Yes ☐ No

If so, what films were retaken:

	RCC	RMLO	LCC	LMLO
Erect	☐	☐	☐	☐
Pendant	☐	☐	☐	☐

Why:

Clinical Evaluation of Pendent Mammography	Subject Initials F M L	Subject Number

Form X: Discontinuation of Subject

Was the subject withdrawn from the study?

☐ Yes ☐ No

Reason:

- ☐ Ineligible
- ☐ Discontinued at subjects request
- ☐ Incomplete Study
- ☐ Mammography system failure
- ☐ Films no longer available through film library
- ☐ Other. Please state reason below
- ☐

State reason: